

cells, comprising introducing a DNA fragment or a plasmid containing the DNA fragment into plants or plant cells or algal cells, wherein said DNA fragment is expressed and has the following characteristics:

- (1) said DNA fragment encodes a part of a protein, wherein said protein has protoporphyrinogen oxidase activity in plants;
- (2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500 μ g/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment remains hybridized after washing in 2X SSC, 1% (w/v) SDS; *temp. of wash?*
- (3) said DNA fragment encodes the part of the protein in which an amino acid corresponding to Val13 of SEQ ID NO:1, is substituted by another amino acid; and
- (4) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when expressed therein.

6. (Twice Amended) The method according to claim 1, wherein said

G protein has protoporphyrinogen oxidase activity in *Chlamydomonas*.

6 2 7. (Amended) The method according to any one of claims 1, 2, 4 or 6, wherein Val13 or the corresponding amino acid is replaced by methionine.

15. (Twice Amended) An isolated DNA fragment which has the following characteristics:

(1) said DNA fragment encodes a part of a protein, wherein said protein has protoporphyrinogen oxidase activity in plants;

(2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500 μ g/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment or its complement remains hybridized after washing in 2X SSC, 1% (w/v) SDS;

(3) said DNA fragment encodes the part of said protein in which an amino acid corresponding to Val13 of SEQ ID NO:1 is substituted by another amino acid; and

(4) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when expressed therein.

64 21. (Twice Amended) The isolated DNA fragment according to any of claims 15, 16, 18 and 20, wherein said another amino acid is methionine.